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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/717,697	11/20/2003	Ryoji Fukuhisa	JP920020182US1	8577

48583 7590 09/29/2006

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EXAMINER
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DILLON, SAMUEL A

ART UNIT	PAPER NUMBER
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2185

DATE MAILED: 09/29/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No. 10/717,697	Applicant(s) FUKUHISA ET AL.	
	Examiner Sam Dillon	Art Unit 2185	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 27 June 2006.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 5,9,10,15 and 20-22 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 5,9 and 10 is/are allowed.
- 6) ☒ Claim(s) 15 and 20 is/are rejected.
- 7) ☒ Claim(s) 21 and 22 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 November 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### DETAILED ACTION

1. The Examiner acknowledges the applicant's submission of the amendment dated June 27, 2006. Per the amendment, Claims 1-4, 6-8, 11-14 and 16-19 have been cancelled, Claims 5 and 15 have been amended and Claims 20-22 have been added.
2. The instant application having Application No. 10/717,697 has a total of 7 claims pending in the application; there are 3 independent claims and 4 dependent claims, all of which are ready for examination by the examiner.

#### **I. RESPONSE TO AMENDMENT(S) / ARGUMENT(S)**

3. In response to the amendment, all objections to and rejections of cancelled claims have been withdrawn.
4. With respect to the previous 35 U.S.C. 103 rejections of Claims 5 and 9-10, Applicant's arguments (*as stated on page 7 lines 3-9*) have been fully considered and are **persuasive**. The 35 U.S.C. 103 rejections of Claim 5 and 9-10 have been withdrawn.
5. Applicant's arguments with respect to the 35 U.S.C. 103 rejection of Claim 15 have been fully considered but are **not persuasive**.
6. In response to Applicant's argument (*page 8 lines 1-6 of the remarks*) that Stockman is nonanalogous art, it has been held that a prior art reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the applicant was concerned, in order to be relied upon as

a basis for rejection of the claimed invention. See *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). Accordingly, the Examiner respectfully disagrees.

Stockman discloses a connected components algorithm for determining the boundary of an object in a two dimensional space. That Stockman applies this algorithm to a "COLORING program" is immaterial, as the motivated inclusion is of the fundamental algorithm (see *previous Action*, bottom of page 28). As stated previously, Dixon discloses discovering and recording disk defects (column 8 lines 35-36), and Otteson discloses that clusters of damaged sectors can occur when the cause is mechanical or non-mechanical surface damage (column 4 lines 5-9).

In combination, the Examiner respectfully asserts that a person having ordinary skill in the art that was in possession of Dixon's system (*designed to find and log disk errors*) and had the knowledge of Otteson (*that disk errors can come in connected groupings*) would find Stockman's algorithm (*that takes an initial sector on a plane and finds sectors surrounding it that share a measurable attribute with the initial sector*) reasonably pertinent to the particular problem at hand.

7. The Applicant additionally contends (page 8 lines 7-8 of the remarks) that Stockman is ineligible as a prior art reference to the present application due to the index on the last page of Stockman citing numerous post-filing references. The Examiner respectfully disagrees.

The Applicant is directed to the 2<sup>nd</sup> page of the PTO-892 dated March 27, 2006. The included Stockman reference, as correctly cited, is of a document with the filename

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"coloring.cc". On the included index page the Applicant will note that the last modified date associated with the filename "coloring.cc" is 26-Jun-1997.

Additionally and for the sake of completeness, the Examiner notes that www.archive.org contains an identical copy with an archive date of October 5, 2002.

## **II. OBJECTIONS TO THE APPLICATION**

8. Claim 20 is objected to because of the following informalities:

- a. Step (g) reads "recording "search completed;" " and should read "recording "search completed"; " (*i.e. reverse the semicolon and quotation mark*).
- b. Step (k) reads "receiving a command **comes** from" and should read "receiving a command from".

Appropriate correction is required.

## **III. REJECTIONS BASED ON PRIOR ART**

### **Claim Rejections - 35 USC ' 103 – Dixon, Ottesen, Stockman and Bovet**

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. **Claims 15 and 20** are rejected under 35 U.S.C. 103(a) as being unpatentable over Dixon et al. (US Patent Number 4,972,316) in view of Ottesen et al. (US Patent Number 6,281,676) and Bovet et al. ("Understanding the Linux Kernel") and Stockman ("Connected Components or COLORING program").

11. As per **Claim 15**, Dixon disclose a data recording device, comprising:

bad sector recording means whereby when receiving (*column 6 lines 38-41*) a command (*column 6 lines 38-41*) that accesses a sector (*page, column 8 lines 35-36*) on a disk-shaped recording medium (*storage media, column 1 lines 5-10*), a bad sector is detected (*has errors, column 9 lines 48-51*), and then an address (*information to tag what physical page is represented by cache page, column 3 lines 13-17*) of the bad sector is recorded (*column 10 lines 40-50*) in a memory (*cache 20, column 3 line 2*); and

detecting means (*processor 12, figure 1*) for detecting (*column 9 lines 48-51*) whether or not a sector is a bad sector (*has errors, column 9 lines 48-51*)

Dixon does not disclose command determining means for determining whether or not a command is being executed; surrounding sector recording means whereby addresses of surrounding sectors adjacent to the bad sector, the address of which is recorded in the memory, is recorded in the memory; and bad-surrounding-sector recording means whereby if the surrounding sector is not a bad sector, the address of the surrounding sector is deleted from the memory, and if the surrounding sector is a bad sector, the address of the surrounding sector is recorded in the memory as a bad sector.

Otteson discloses that mechanical and non-mechanical surface damage can cause regions of adjacent bad sectors (*Otteson, column 4 lines 5-9 and figure 2 element 208*).

Stockman discloses a method (*void propagate\_color, page 2*) for identifying a region of sectors sharing the same attribute ('1's, *page 1 lines 2-4*), comprising

recording means whereby addresses (*r and c of each function call, function propagate\_color, lines 9-12*) of surrounding sectors (*4-neighbors, function propagate\_color, line 8*) adjacent to the bad sector, the address of which is recorded in the memory, is recorded in the memory (*the recursion of the propagate\_color function puts the parameters onto the memory stack when propagate\_color is called on an adjacent sector (as in lines 9-12 of the function definition), fulfilling the limitation "is recorded in memory"*);

recording means whereby if the surrounding sector is a sector of the same attribute as the original sector (*function propagate\_color, line 5*), the address of the surrounding sector is recorded (*function propagate\_color, line 6*) in the memory (*image object in memory, function propagate\_color, line 6*) as a similar sector;

processing that deletes (*return, function propagate\_color, line 5*) an address of a sector (*pixel, function propagate\_color, line 6*), a search (*function call of itself, function propagate\_color, lines 2-3*) for which has already been completed (*already colored, function propagate\_color, line 5*), from the addresses of the surrounding sectors (*the function propagate\_color recursively*

*calls itself on each sector surrounding the passed address (r,c), and the function will stop processing itself if it finds that the address it is told to test has already been tested (colored); Accordingly, this functionality fulfils the limitation "deletes an address ... from the address of the surrounding sectors recorded in the memory") recorded in the memory by the surrounding sector recording means (function propagate\_color);*

*processing whereby focusing on the two bad sectors adjacent to each other (the Examiner interprets this claim language to mean in the case of claim 15 lines 12-14 of the preliminary amendment where a bad sector is found next to the original bad sector, in which case Stockman's function propagate\_color will call propagate\_color again on the original location, function propagate\_color, page 2), each address of surrounding sectors adjacent to one bad sector is mutually compared with each address of surrounding sectors adjacent to the other bad sector, and one of duplicated surrounding sectors is deleted from the memory (if the propagate\_color function is called on a sector that has already been visited, it immediately returns, function propagate\_color, line 5).*

*Bovet discloses command determining means (kernel, section 10.1.1, paragraph 1 line 2) for determining whether or not a command (process with higher dynamic priority, section 10.1.1, paragraph 1 line 1-2) is being executed (section 10.1.1, paragraph 1 lines 5-6).*

The Examiner reads the above claim language falling under 35 U.S.C. 112 6<sup>th</sup> paragraph as having the following structure, as per the specification: "means for



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*determining*" is found to be HDD 1 (*paragraph 31*); *"means for detecting"* is found to be HDD 1 (*paragraph 32*).

Dixon and Otteson are analogous art in that they both deal with detecting defects in disk drives. Dixon, Otteson and Stockman are analogous art in that Dixon and Otteson have an initial sector and a possible region containing that sector, and Stockman discloses an algorithm that takes a starting sector and determines the extent of a region containing that sector. Dixon and Bovet are analogous art in that they both deal with operating systems running multiple processes (*see Dixon, column 2 lines 15-19 and column 3 lines 1-4*). At the time of the invention, it would have been obvious to a person of ordinary skill in the art to initiate Stockman's cluster detection method (*propagate\_color*) to find the region predicted by Otteson in response to the storage device of Dixon finding an error, and additionally it would be obvious to run Stockman's process as a background process (*Bovet, section 10.1.1, paragraph 2 lines 10-11*), as taught by Bovet.

The motivation for doing so would have been that clusters of damaged sectors can occur when the cause is mechanical or non-mechanical surface damage (*Otteson, column 4 lines 5-9*), and Stockman discloses that his method will identify objects which are connected "blobs" of '1's in a background of '0's (*Stockman, page 1 lines 1-3*). Dixon states that a goal of his system is to provide transparency to the user (*Dixon, column 2 lines 15-19*) and to improve system performance (*Dixon, column 1 lines 36-38*). Accordingly, the motivation for running Stockman's process as a background

process would have been to allow the device to automatically interrupt the detection process when a command is received (*Bovet, section 10.1.1, paragraph 2 lines 4-8*).

Therefore, at the time of the invention it would have been obvious to combine Dixon's system with Stockman's cluster detection method and Bovet's background processes for the benefit of identifying all the errors in a cluster predicted by Otteson without hindering system performance, to obtain the invention of Claim 15.

12. As per Claim 20, Dixon, Ottesen, Stockman and Bovet disclose a method of searching for a bad sector among surrounding sectors in a data storage device (see *motivated combination as used in the rejection of Claim 15 above*), comprising:

a) initiating a search for a bad sector (*Dixon, column 9 lines 48-51*) having an earliest recorded search history information of unsuccessful location of the bad sector among one or more bad sectors (*Stockman, r and c of each function call is location, function propagate\_color, lines 9-12, and the current position in the algorithm is the search history information, being that if the algorithm is suspended as described in Bovet above then when it is returned it will start executing from the same instruction that it was suspended on;*);

b) determining whether information is recorded as search history information about the bad sector to be searched for (*Stockman's algorithm starts in the same place as it was before, so if it is part way through an instance of propagate\_color, see lines 9-12, then it will load the previous information / variables / state of the process*);

c) if no information is recorded as the search history information about the bad sector, initializing data about the search for the bad sector (*Stockman's algorithm can continue from the very start of the propagate\_color function call, see lines 9-12*);

d) recording "search being executed" as the search history information corresponding to the bad sector to be searched for (*inherently implied in Stockman, in that if the algorithm is doing that, then that is the state information that is saved when the process is removed from active execution*);

e) executing processing of the search for the bad sector (see *Stockman's propagate\_color, lines 9-12 and Dixon, column 9 lines 48-51*);

f) recording "search completed" when the search is completed (*returning at end of Stockman's propagate\_color, lines 9-12*), and continuing with step k);

g) recording "search completed" (*inherently implied in Stockman and Bovet, see above*);

h) checking whether there is a bad sector that should be searched for (*Stockman, function propagate\_color, line 1*);

i) if there is a bad sector to be searched for, selecting the bad sector (*Stockman, continuing execution of function call without returning, function propagate\_color, line 1*), and recording "search being executed" before proceeding to step e);

j) if there is no bad sector to be searched for, ending the search (*Stockman, function propagate\_color, line 1*);

k) receiving a command comes from a host computer while executing the search (*Dixon, column 6 lines 38-41 and Bovet, section 10.1.1 paragraph 1*);

l) recording "search interrupted/restart waiting" as the search history information corresponding to the bad sector that is being searched for (*saving process state information is inherently implied in Stockman and Bovet, see above*); and

m) interrupting the search (*Bovet, section 10.1.1 paragraph 1*).

#### **IV. CLOSING COMMENTS**

**13. THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

**14.** A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

##### **a. STATUS OF CLAIMS IN THE APPLICATION**

**15.** The following is a summary of the treatment and status of all claims in the application as recommended by M.P.E.P. ' 707.07(i):

**a(1). SUBJECT MATTER CONSIDERED ALLOWABLE**

16. Claims 5 and 9-10 are allowed.
17. Claims 21 and 22 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.
18. The prior art of record neither anticipates nor renders obvious the below:
  - c. The primary reasons for allowance of Claims 5 and 9-10, but more specifically to Claim 5, in the instant application is the combination with the inclusion that: **if the surrounding sector is not a bad sector, the address of the surrounding sector is deleted from the memory.**
  - d. The primary reasons for allowance of Claim 21 in the instant application is the combination with the inclusion: **storing information about bad sectors in a ring buffer.**
  - e. The primary reasons for allowance of Claim 22 in the instant application is the combination with the inclusion: **recording information about sectors surrounding the bad sector as data about the search for the bad sector after the surrounding sectors have been searched.** Stockman discloses recording information about sectors surrounding the bad sector as data about the search for the bad sector *while* searching the surrounding sectors.

**a(2). CLAIMS NO LONGER IN THE APPLICATION**

19. Claims 1-4, 6-8, 11-14 and 16-19 were cancelled by the amendment dated June 27, 2006.

**a(3). CLAIMS REJECTED IN THE APPLICATION**

20. Per the instant office action, Claims 15 and 20 have received a second action on the merits and are subject of a second action final.

**b. DIRECTION OF FUTURE CORRESPONDENCES**

21. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sam Dillon whose telephone number is 571- 272-8010. The examiner can normally be reached on 9:30-6:00.

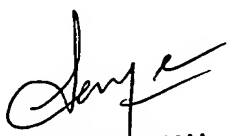
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sanjiv Shah can be reached on 571-272-4098. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

**IMPORTANT NOTE**

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



SAD



SANJIV SHAH  
PRIMARY EXAMINER

Sam Dillon  
Examiner  
Art Unit 2185